

WHAT IS CLAIMED IS:

1. A process for the production of para-xylene comprising contacting an aromatics-feedstock comprising toluene with a selectively pre-coked catalyst at disproportionation conditions comprising a hydrogen-to-hydrocarbon molar ratio of less than 3.0 and a toluene conversion greater than 30 wt-% calculated on a feed basis to obtain a para-xylene rich product containing para-xylene in excess of its equilibrium concentration.
2. The process of claim 1 wherein the selectively pre-coked catalyst is selectively pre-coked by contacting the catalyst with a coke-forming feed at pre-coking conditions comprising an inlet temperature of about 300° to about 700°C, a pressure of about 100 kPa to about 4 MPa absolute, a liquid hourly space velocity of about 0.2 to about 20 hr⁻¹, and a molar ratio of hydrogen to coke-forming feed of about 0.01 to about 5.
3. The process of claim 2 wherein the pre-coking conditions further comprise nitrogen present in the pre-coking step in a molar ratio to coke-forming feed of about 0.01 to about 10.
4. The process of claim 1 wherein the disproportionation conditions further comprise an inlet temperature from about 200° to about 600°C, a pressure of from about 100kPa to about 6 MPa absolute, and a liquid hourly space velocity of about 0.2 to about 20 hr⁻¹.
5. The process of claim 1 wherein the hydrogen-to-hydrocarbon molar ratio is between about 0.1 and about 1.0.

6. The process of claim 5 wherein the hydrogen-to-hydrocarbon molar ratio is between about 0.2 and about 0.5.

7. The process of claim 1 wherein the toluene conversion is greater than about 33 wt-%.

5 8. The process of claim 1 wherein the catalyst comprises a zeolitic aluminosilicate having a pore diameter of about 5 to about 8 angstroms and a binder.

9. The process of claim 8 wherein the zeolitic aluminosilicate comprises a pentasil zeolite selected from the group consisting of MFI, MEL, MTW, and TON.

10. A process for the production of para-xylene comprising:

10 a) disproportionating an aromatics feedstock comprising toluene by contacting the feedstock with a selectively pre-coked catalyst at disproportionation conditions comprising free hydrogen present in a molar ratio to feedstock hydrocarbons of less than 3.0, an inlet temperature from about 200° to about 600°C, and a pressure of from about 100kPa to about 6 MPa absolute, to
15 obtain a para-xylene-rich product by conversion of greater than 30 wt-% of the toluene in the feedstock;

 b) the selectively pre-coked catalyst being pre-coked by contacting the catalyst with a coke-forming feed at pre-coking conditions comprising an inlet temperature of about 300° to about 700°C, a pressure of about 100 kPa to
20 about 4 MPa absolute, a molar ratio of free hydrogen to coke-forming feed of about 0.1 to about 5, and a molar ratio of nitrogen to coke-forming feed of about 1 to about 10, to obtain the selectively pre-coked catalyst; and

c) recovering para-xylene from the para-xylene-rich product by one or both of adsorption and crystallization.

11. The process of claim 10 wherein disproportionation conditions of step (a) and the pre-coking conditions of step (b) are carried out in the same vessel at a liquid hourly
5 space velocity of about 0.2 to about 20 hr⁻¹.

12. The process of claim 11 wherein the catalyst comprises a zeolitic aluminosilicate having a pore diameter of about 5 to about 8 angstroms and a refractory inorganic-oxide binder comprising aluminum-phosphate.

13. The process of claim 10 wherein the conversion is greater than about 33 wt-%.

10 14. The process of claim 10 step (a) wherein the free hydrogen is present in a molar ratio to feedstock hydrocarbons of about 0.1 to about 1.0.

15. A process for the production of para-xylene comprising:

a) disproportionating a toluene-containing feedstock by contacting the feedstock with a catalyst selectively pre-coked in the presence of an inert gas, said
15 contacting occurring at disproportionation conditions comprising free hydrogen present in a molar ratio to feedstock hydrocarbons of about 0.1 to about 1.0, an inlet temperature from about 200° to about 600°C, a pressure of from about 100kPa to about 6 MPa absolute, and a liquid hourly space velocity of about 0.2 to about 20 hr⁻¹ to obtain a para-xylene-rich product
20 containing para-xylene in excess of its equilibrium concentration by conversion of greater than 33 wt-% of the toluene present in the feedstock ;

- b) recovering para-xylene from the para-xylene-rich product by one or both of adsorption and crystallization; and
- c) carrying out step (a) for a period of time until the initial inlet temperature has increased by 20°C or greater, at which point the catalyst is rejuvenated by increasing the molar ratio of free hydrogen to feedstock hydrocarbons to greater than 1.0.

16. The process of claim 15 wherein the conversion of toluene is about 33 wt-% or greater.

17. The process of claim 15 wherein the conversion of toluene is about 30 to about 33 wt-%.

18. The process of claim 17 wherein the para-xylene-rich product of step (b) further comprises benzene present in an amount no greater than about 15 wt-% calculated on a toluene feed basis.

19. The process of claim 15 wherein the rejuvenation conditions of step (d) further comprise free hydrogen present in a molar ratio to feedstock hydrocarbons of about 1 to about 5, an inlet temperature from about 200° to about 600°C, a pressure of from about 100kPa to about 6 MPa absolute, and a liquid hourly space velocity of about 0.2 to about 20 hr⁻¹.

20. The process of claim 15 wherein the catalyst is selectively pre-coked by contacting a pentasil zeolite selected from the group consisting of MFI, MEL, MTW, and TON, with a coke-forming feed in the presence of a gas comprising hydrogen and an inert diluent-gas at pre-coking conditions comprising an inlet temperature of about 300° to

about 700°C, a pressure of about 100 kPa to about 4 MPa absolute, a molar ratio of free hydrogen to coke-forming feed of about 0.1 to about 5, a molar ratio of inert diluent-gas to coke-forming feed of about 0.01 to about 10, and a liquid hourly space velocity of about 0.2 to about 20 hr⁻¹, to deposit between about 5 and about 40 mass-% carbon on the catalyst and obtain a selectively pre-coked catalyst.

21. The process of claim 20 wherein the inert diluent-gas is selected from the group consisting of nitrogen, methane, ethane, propane, and mixtures thereof.